Fiber Optic Coherent Laser Radar 3D Vision System

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Abstract

Recent advances in fiber optic technology and digital signal processing components[1] have enabled development of a new three dimensional (3D) vision system. The approach includes a compact scanner with no moving parts providing rapid random pixel scanning and an FMCW coherent laser radar providing precise range measurements regardless of ambient lighting conditions. A laboratory prototype has been built and demonstrated with capability for 128 x 128 pixel, one frame per second, 3D mapping and imaging. This paper presents details and performance of the prototype system.

This is an enabling technology for autonomous robotic control. Other methods of obtaining 3D range information are strongly affected by ambient lighting and both color and shading of the object. Although a human viewing a video monitor is not confused by these effects, robot vision requires clear, precise data. The 3D vision system provides the requisite data quality.

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